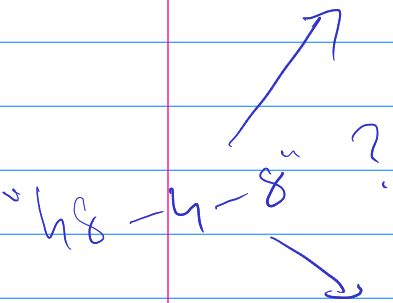
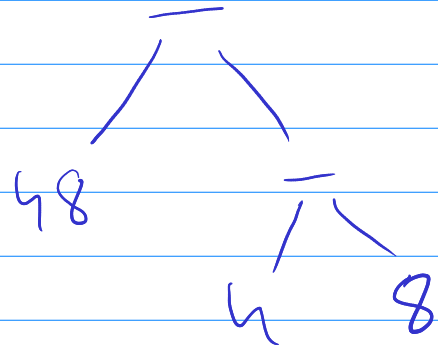
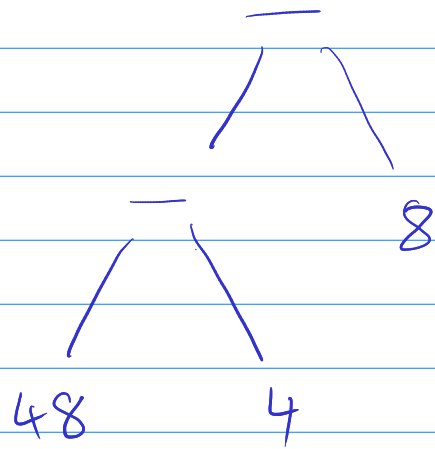
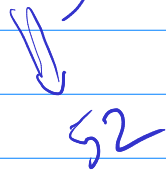


$$(48 - 4) - 8$$



$$48 - (4 - 8)$$



48-4-8

$e ::= c$

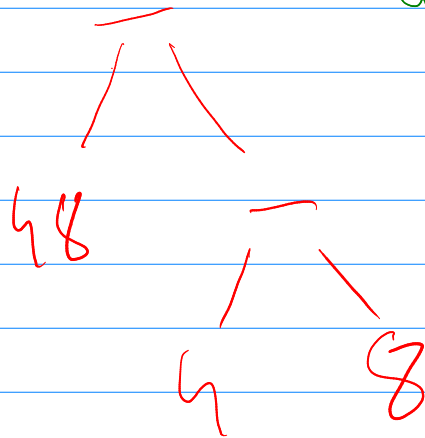
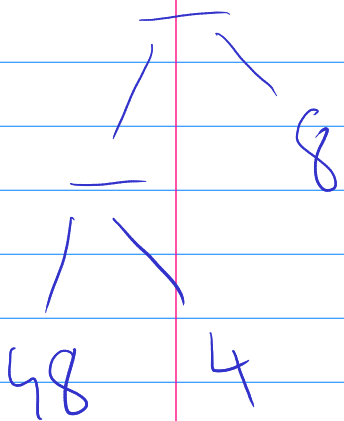
$e + e$

$e - e$

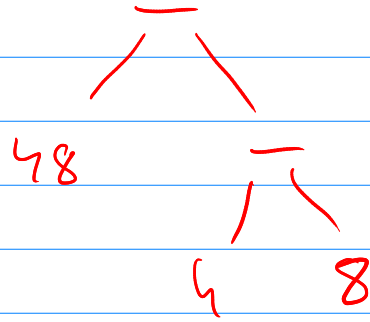
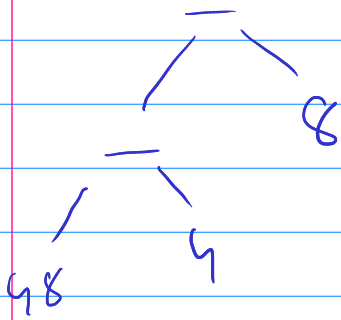
Q1 - How to build expressions

Q2 How to recognize expressions

Given an expression tell me what the parse tree should be.



The same string  $48-4-8$  admits two parse trees.



Grammar is "ambiguous"

$$(32 - 48) + 56 + 63 - 37 + 96$$

$$48 - 4 + 8$$

$$e ::= c$$

$$| e + e$$

$$| e - e$$

$$e ::= c$$

$$| e + e$$

$$| e - c$$

$$\overbrace{48 - 4 - 8}$$

Q1: The grammar admits some parse trees

Are all those parse trees intuitively legal?

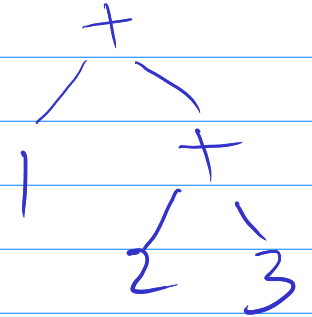
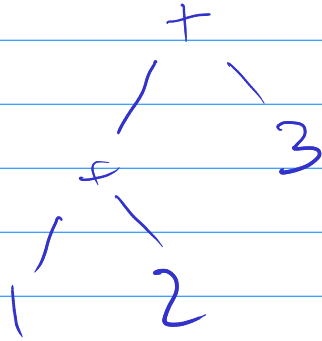
Expressions

Q2: We have an intuition for what expressions look like.

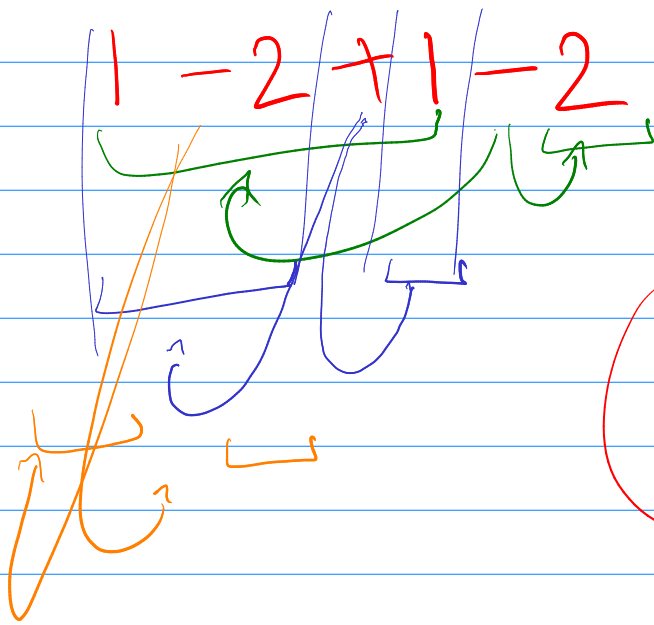
Is every intuitively legal expression parseable?

$$(((42 - 97) + 86) - 42) + 27) - 39)$$

$$1 + 2 + 3$$



$$\begin{array}{c}
 e ::= c \\
 | e + e \\
 | e - e
 \end{array}
 \quad
 \begin{array}{c}
 e ::= c \\
 | e + e \\
 | e - c
 \end{array}
 \quad
 \begin{array}{c}
 e ::= c \\
 | e + c \\
 | e - c
 \end{array}$$



$$((1) - 2) + 1) - 2$$